Project Fact Sheet

Natural Gas Cofiring in Biomass Boilers

GOALS

- Improve the economics of grid-connected, distributed electricity generating biomass facilities.
- Improve environmental and public health costs/risk of California's electricity by mitigating air quality impacts from biomass combustion.
- Preserve employment opportunities in rural areas where these biomass facilities are typically located.

PROJECT DESCRIPTION

The purpose of this project is to develop and retrofit low NO_x gas cofire technology on two biomass fired industrial power boilers at Burney Mountain Power and Fairhaven Power.

With biomass, the high fuel moisture level and high fuel quality variability reduce electric competitiveness and increase environmental compliance costs. By firing small amounts of gas, approximately 10 percent of total heat input, operators can control the combustion process and avoid the usual problems that accompany combustion of wet biomass. Cofire offers an independently controlled combustion zone with higher temperatures, resulting in faster load response, better CO and opacity burnout, reduces carbon in the ash, and faster, cleaner startup. These benefits are essential for biomass to compete in the volatile deregulated power market that requires greater responsiveness than is now possible.

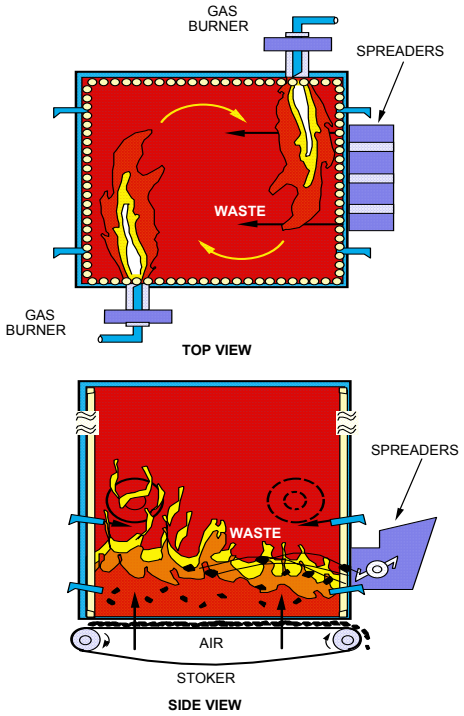
In this project, GTI has subcontracted the development of a low NO_x burner to the cofire burner developer, Coen. The low NO_x burner will retain the high-pressure drop feature used earlier, but employs segmented gas/air zones and possibly inspirated combustion gas dilution. The prototype burner will be installed in two northern California biomass power plants: Burney Mountain Power and Fairhaven Power. At Burney, cofire will allow recovery of lost derate and allow peak revenue load dispatch to effectively meet changing power demand. At Fairhaven, cofire will recover lost derate and allow compliance with CO and NOx regulations.

In summary, the project will:

- Develop a low NO_x cofire burner for application to biomass fueled boilers.
- Apply the low NO_x cofire burner to increase the load following capability and turndown for Burney Mountain Power.
- Apply the low NO_x cofire burner to reduce CO emissions and recover lost derate with wet wood at Fairhaven Power.
- Apply cofiring at Burney Mountain Power to capture high revenue power peaks and avoid low revenue periods to allow operation in the deregulated power market and reduce the break-even power price.
- Apply cofiring at Fairhaven Power to recover lost derate with wet wood and accrue incremental power sales revenue over the differential fuel price.

BENEFITS TO CALIFORNIA

This project will increase competitiveness and environmental compliance costs by developing new technology for California's biomass industry. The technology will increase the load following capability of a California biomass power plant, while reducing CO emissions and improving the economic efficiency of the plant. The low NO_x feature in this project is unique to California, and this demonstration should facilitate cofire permitting at other biomass facilities.



FUNDING AMOUNT

Commission	$655,702
Match	$732,736
Total	$1,388,438

PROJECT STATUS

This project was completed in March 2002. The contract between GRI and the State of California was signed on December 29, 1998. Contracts with the principal subcontractors - ARCADIS Geraghty & Miller, and COEN were also signed.

Burner system installation on the 10 MW-boiler at Burney Mountain Power plant in Burney, California was completed in March 2000. A new gas pipeline from the Pacific Gas & Electric main transmission line to the boiler was installed. Burner start up and system testing and performance optimization were performed.

Required modifications to reduce NO_x emissions and performance optimization of Fairhaven Power plant in Eureka, California were incorporated during scheduled plant outage. System testing and performance optimization were performed.

FOR MORE INFORMATION

Prab Sethi
Project Manager
California Energy Commission
1516 Ninth Street, MS-43
Sacramento, CA 95814
(916) 654-4509
psethi@energy.state.ca.us

John Pratapas
Manager, Business Development
Gas Technology Institute
Des Plaines, IL
(847) 768-0820
john.pratapas@gastechnology.org